

Claims

What is claimed is:

1. A method of encoding a data packet with an extension field, wherein the data packet substantially conforms to a standardized AV/C command or response data packet for transmitting the data packet over a network, the method comprising the steps of:
 - a) providing a data packet with a control data frame having a fixed payload, wherein the control data frame comprises a sequence of data fields; and
 - b) providing extended fields data within at least one of the data fields, wherein the extended fields data encodes the data packet for the extension data field.
2. The method of claim 1, wherein the network is a network which substantially complies with a version of the IEEE 1394 standard.
3. The method of claim 1, wherein the data packet is an asynchronous data packet comprising a header portion and wherein the control data frame includes a cts data field, a data type data field, a subunit type data field, a subunit ID data field, and operand data fields and wherein the extended fields data is provided within the cts data field and the extension data field holds at least one byte of extension data.
4. The method of claim 1, wherein the extended fields data comprises one byte of data including a first hexadecimal data value and a second hexadecimal data value and encodes the data packet to hold a number of extension data bytes, wherein the number of extension data bytes is determined such that when the first hexadecimal data value of the

5 extended fields data is equal to eight, the second hexadecimal data value of the extended
6 fields data equals the number of extension data bytes; and when the first hexadecimal
7 data value is equal to nine, the number of extension data bytes is fifteen plus the second
8 hexadecimal data value.

1 5. The method of claim 4, wherein the extended fields data further encodes the data packet
2 for a transaction data field capable of holding one byte of transaction data.

1 6. The method of claim 1, wherein the number of one byte extension data fields is
2 determined such that when a first hexadecimal data value of the extended fields data is
3 equal to eight, a second hexadecimal data value of the extended fields data equals the
4 number of extension data fields; and when the first hexadecimal data value is equal to
5 nine, the number of extension data fields is fifteen plus the second hexadecimal data
6 value.

1 7. A data stream for asynchronous data transmission from a client device to a target device
2 over a standard IEEE 1394 serial bus network, wherein the stream of data comprises data
3 packets with control data frames having a fixed data payload and, wherein at least one of
4 the data packets comprises a control data frame with extended fields data and feature
5 data, wherein the extended fields data provides a signature for the presence of the feature
6 data to the target device.

1 8. The data stream of claim 7, wherein the extended fields data further provides a signature
2 for the quantity of feature data.

- 1 9. The data stream of claim 7, wherein the extended fields data comprises one byte of data
2 including a first hexadecimal data value and a second hexadecimal data value and
3 wherein the extended fields data encodes the data packet for a number of extension data
4 fields that each hold one byte of extension data, wherein the number of extension data
5 fields is determined such that when the first hexadecimal data value of the extended fields
6 data is equal to eight, the second hexadecimal data value of the extended fields data
7 equals the number of extension data fields; and when the first hexadecimal data value is
8 equal to nine, the number of extension data fields is fifteen plus the second hexadecimal
9 data value.
10. The data stream of claim 7, wherein the feature data includes one byte of feature data that
provides a transaction label code representing a history of a previous data transmission
between the client device and the target device.
11. A system for transmission of asynchronous AV/C command and response data over a
standard IEEE 1394 serial bus, the system comprising:
- a) a control device in communication with the standard IEEE 1394 serial bus, the
control device being configured for generating a command data stream
comprising at least one command data packet with a control data frame
comprising control data fields; and
- b) a target device in communication with the standard IEEE 1394 serial bus, the
target device being configured for receiving the command data stream and
generating a corresponding response data stream comprising at least one response

10 data packet with a control data frame comprising a target data fields wherein at
11 least one of the target data fields is a response transaction label data field
12 containing transaction label data that codes the response data stream for the
13 compatibility of the target device with the command data stream received.

1 12. The system of claim 11, wherein the transaction label data that codes the response data
2 stream for error status and error labels.

1 13. The system of claim 11, wherein at least of the control data fields is a command
2 transaction data field containing command transaction data, and further wherein the
3 response transaction data and the control transaction data match the command data stream
4 with the corresponding response data stream.

1 14. The system of claim 11, wherein the target device is a video recorder subunit.

1 15. The system of claim 11, wherein the control device comprises a video screen and an input
2 device.

1 16. The system of claim 11, further comprising a memory unit for storing transaction data
2 values data.

- 1 17. A method for the transmission of AV/C command and response data packets over an
2 IEEE 1394 serial bus, the method comprising the steps of:
- 3 a) submitting an AV/C command data packet from a control device with features
4 over the serial bus to a target device comprising more or less features than the
5 control device, wherein the command data packet is formatted with containing
6 extension fields and extension data for supporting all of the control device
7 features;
- 8 b) receiving the AV/C command data packet at the target device and generating a
9 response data packet therefrom, wherein the response data packet is absent of a
10 portion of the extension data and containing response extension data fields and
11 extension data for supporting all of the features of the target device; and
- 12 c) transmitting the response data packet to the control device, wherein the control
13 device reads the response data packet and formats subsequently transmitted
14 command data packets to comprise extension data fields and extension data for
15 supporting features of both the control device and the target device.
- 1 18. The method of claim 17, wherein a record of features that are supported by both the
2 control device and the target device is kept by the control device.
- 1 19. A system for transmission of asynchronous AV/C command and response data over a
2 standard IEEE 1394 serial bus, the system comprising:
- 3 a) a control device in communication with the standard IEEE 1394 serial bus, the
4 control device being configured for generating a command data stream
5 comprising at least one command data packet with a control data frame

- 6 comprising control data fields, wherein at least one of the control data fields
7 comprises extended fields data providing a signature for control device features;
8 and
9 b) a target device in communication with the standard IEEE 1394 serial bus, the
10 target device being configured for receiving the command data stream and
11 generating a response data stream comprising at least one response data packet
12 with a control data frame comprising a target data field, wherein the target data
13 field comprises features data providing a signature of features implemented at the
14 target device.
- 11 20. The system of claim 19, wherein the response data packet provides a signature for
12 features supported by both the control device and the target device.
- 13 21. The system of claim 19, wherein the control device is capable of adding or removing the
14 extended fields data field for subsequently transmitted command data packets in the event
1 that the target device does not support features encoded for therein.
- 1 22. The system of claim 19, wherein the target device is a video recorder subunit.
- 1 23. The system of claim 19, wherein the control device comprises a video screen and an input
2 device.

1 24. The system of claim 19, wherein the control device is capable of storing the feature data
2 to provide a history of at least one data transmission between the control device and the
3 target device.

1 25. A method of establishing a communication protocol for the transmission of AV/C
2 command and response data packets over an IEEE 1394 serial bus, the method
3 comprising the steps of:

- 4 a) submitting an AV/C command data packet from a control device over the serial
5 bus to a target device, wherein the command data packet is formatted with
6 extended fields data and extension fields which provides a feature signature for
7 features of the control device;
8 b) detecting the extended fields data at the target device and generating a response
9 data packet therefrom, wherein the response data packet provides a compatibility
10 signature for control device features that are compatible with the target device;
11 and
12 c) transmitting the response data packet to the control device, wherein the control
13 device reads the response data packet and formats subsequently transmitted
14 command data packets transmitted to the target device to comprise extended fields
15 data and extension data fields that support compatible features.

1 26. The method of claim 25, wherein when the response data packet contains an error
2 message, extended fields data and extension data fields are removed from the
3 subsequently transmitted command data packets.

- 1 27. The method of claim 25, wherein an established communication protocol is stored by
2 target device to provide a history of the compatible device features.